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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/909,975	07/23/2001	Yukio Maki	57454-162	2289

7590 04/23/2004

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Washington, DC 20005-3096

EXAMINER

OWENS, DOUGLAS W

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 04/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/909,975

Applicant(s)

MAKI, YUKIO

Examiner

Douglas W Owens

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Prosecution Reopened

1. Applicant is advised that the Notice of Allowance mailed is vacated. If the issue fee has already been paid, applicant may request a refund or request that the fee be credited to a deposit account. However, applicant may wait until the application is either found allowable or held abandoned. If allowed, upon receipt of a new Notice of Allowance, applicant may request that the previously submitted issue fee be applied. If abandoned, applicant may request refund or credit to a specified Deposit Account.
2. In the Office Action mailed on October 22, 2003, claims 1 and 3 – 6 [1 – 6] were indicated as being allowable. The notice of allowability was in response to the amendment filed on September 30, 2003. In the amendment, Applicant canceled substantial subject matter from independent claim 1 to resolve a 35 USC 112, 2nd paragraph issue, which was pointed out in the Office Action mailed on June 30, 2003, paper 16. Subject matter Applicant vehemently argued the patentability thereof in responses filed on September 26, 2002 and March 11, 2003 was also deleted from the claims in the response filed on September 30, 2003. The Office Action of June 30th did not include an art rejection. In reviewing the correction of the 35 USC 112, 2nd paragraph issue, it did not come to the light that the newly amended claim now read on the previously cited Hashimoto reference. It is in view of this reference and the Ando reference (also cited previously) that the Notice of Allowance is vacated.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 5 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The scope of claims 5 and 6 is nebulous, since the claims depend from claim 2, which no longer exists in the application. The limitations intended to be included in claims 5 and 6 are not known.

6. Claim 6 recites the limitation "...said MOS driver transistor..." in line 3. There is insufficient antecedent basis for this limitation in the claim. The scope of this limitation is vague since there is no prior mention of a "driver MOS transistor", only a "drive MOS transistor". However, since the claim compares the thickness of the insulators of the **driver** MOS and the **drive** MOS (emphasis added), it is not possible to tell what insulator films to compare.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 3 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by US patent No. 5,455,438 to Hashimoto et al.

Regarding claim 1, Hashimoto et al. teaches a semiconductor device (Fig. 1a, for example), comprising an SRAM (Col. 16, lines 7 – 14) including:

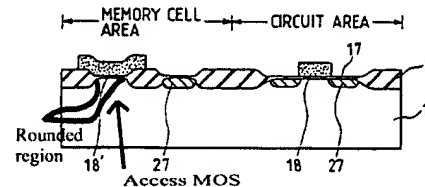
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a semiconductor substrate (1);

an access MOS transistor (note memory cell area, with gate 18') formed on an active region bounded by an isolation region (2), wherein a surface of the active region is rounded (surface adjacent the gate 18') so as to be inclined downward toward said isolation region (See figure at right taken from Fig.

1(a) of Hashimoto et al.); and

a drive transistor.



Although the drive transistor is not shown in the illustrations, as acknowledged by Applicant in the discussion of the prior art (page 2, lines 4 – 8), a driver MOS transistor is a part of an SRAM memory cell, the SRAM having "...a large current ratio of the driver MOS transistor to the access MOS...".

Regarding claim 3, Hashimoto et al. teaches a semiconductor device as cited above, wherein:

an isolation insulating film (2) is formed in the isolation region;

the isolation insulating film includes a bird's beak portion extending on the active region; and

the active region is covered with the bird's beak portion.

Regarding claim 4, Hashimoto et al. teaches a semiconductor device, wherein the bird's beak portion has a larger thickness near the isolation region than in a center of the active region.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 5 and 6 (as far as an indefinite claim can be understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto et al. as applied to claims 1, 3 and 4 above, and further in view of US patent No. 5,285,096 to Ando et al.

In the rejection of claim 6, Examiner has interpreted the claim to mean that the thickness of the access MOS gate insulating film is thicker than the driver MOS gate insulating film.

Hashimoto et al. does not teach a semiconductor device wherein the gate insulating film of the access MOS transistor is thicker than the gate insulating film of the driver MOS transistor. Nor does Hashimoto et al. teach an access MOSFET with a shallower [smaller] doping depth than that of the driver MOS transistor.

Ando et al. teaches a semiconductor device (Fig. 4, for example), wherein the access MOS transistor has a thicker gate insulator (3b) than the gate insulator (3a) of the driver MOS transistor. It would have been obvious to one of ordinary skill in the art at the time the invention was made, to incorporate the teaching of Ando et al. into the device taught by Hashimoto et al. since it is desirable to ensure high stability of the memory cell (Ando, Col. 3, lines 15 – 34). Furthermore, if the suggested modification had been made to the device taught by Hashimoto, the resulting gate insulator for the

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access MOS transistor would have consumed more of the silicon substrate than the gate insulator of the driver MOS transistor. This modification would have inherently produced a shallower doping depth.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 571-272-1662. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DWO



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800